USIKOV, A. Ya.

USSR/Electricity - Faults, Location of Pulse Method — Oct 51

"The Pulse Method for Determining Faults in Cables," A. Ya. Usikov, Cand Phys Math Sci, I. Kh. Vakser, Engr, Physicotech Inst, Acad Sci Ukrainian SSR

"Elektrichestvo" No 10, pp 20-24

Describes a pulse instrument for detg the fault point in power cables. The instrument is effective over a distance of about 500 m, with an error of 4-5 m. Tabulates results obtained by the Khar'kov Streetcar and Trolley Bus Adm in

201T38

USSR/Electricity - Faults, Location of (Contd) — Oct 51

using the instrument to find faults in SB-1,000 cables. States that amplification of the reflected signals would permit detn of nonuniformities in cables, particularly in hf coaxial cables. Submitted 17 Jan 51.

201T38

USIKOV, O.YA.

MIKHAYLOV, G.S. [Mykhaylov, H.S.]; USIKOV, O.Ya. [Usikov, O.IA.].

Atomic number dependence of the electron work function and of the metal atomic heats of sublimation. Ukr. fiz. zhur. 2 no.4:380-382 O-D '57. (MIRA 11:3)

1. Institut radiofiziki ta elektroniki AN URSR.
(Heat of sublimation) (Electron emission) (Metals)

USIKOV, A. Ya.

Г. М. [illegible]

Внезапное затухание коротких радиоволн в ионосфере. Статистика наблюдений за время с 1938 до 1957 гг.

В. Е. [illegible]

Методы безымпульсного [illegible] [illegible] слоя ионосферы

Г. В. [illegible],
Ю. В. [illegible]

Ионосферная станция ручного управления с механическим сопряжением настроек передатчика и приемника

11 июня
(с 10 до 16 часов)

Е. Л. [illegible],
А. Д. [illegible]

О [illegible] граничных условий в теории распространения радиоволн вдоль земли

С. М. [illegible] (Чехословакия)

[illegible] эффекта Допплера третьего советского искусственного спутника Земли

В. А. [illegible]

Исследование [illegible] [illegible] движений в ионосфере.

Н. Н. [illegible]

Спорадический слой Е по наблюдениям на станциях Советского Союза за период Международного геофизического года

Н. С. [illegible],
А. Я. Усиков

Отражение радиоволн [illegible] диапазона от слоя [illegible]

11 июня
(с 18 до 22 часов)

В. С. [illegible] (США)

Применение тропосферного распространения УКВ для целей [illegible] радиосвязи и телевидения

Н. Н. [illegible]

Исследование дальнего приема телевидения и других сигналов на УКВ

В. Ф. [illegible]

Дальний и [illegible] прием телевизионных сигналов

report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. [illegible] Popov ([illegible]), Moscow, 8-12 June. 1959

S/141/60/003/004/005/019
E192/E382

9,9500

AUTHORS: Zinchenko, N.S. and Usikov, A.Ya.

TITLE: Reflection of the Radio Waves of the Millimetre Wave Band from a Layer of Snow

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol. 3, No. 4, pp. 614 - 618

TEXT: The wavelengths employed in the measurements were 31.9, 13.6, 8.5, 6.7 and 4.4 mm. The measurement was based on the method of surface reflection in free space. The equipment employed consisted of a transmitter and a receiver which were arranged in the manner illustrated in Fig. 1. By means of the equipment it was possible to measure the height and the inclination of the transmitter and the receiver with respect to the reflecting plane. During this measurement, the incidence angles of the radio waves were changed since the axes of the antennae were directed at the same point of the reflecting surface. The receiver was based on a crystal detector placed in a waveguide and a mirror galvanometer having a low internal impedance. The antennae were in the form of pyramidal horns, a pair of them being provided for each wavelength. The width of the beam of the antennae was 6° for all the waves except for 31.9 mm, where

Card 1/3

Reflection of the Radio Waves of the Millimetre Wave Band from a Layer of Snow

it was 10^0. The equipment permitted the measurement of the reflection coefficient R of snow for incidence angles ranging from 30 to 80^0. The circles (points) of Fig. 2 show R as a function of ϑ for the snow density $\rho = 0.37$ g/cm^3, the thickness of the snow layer being 14 cm. The shaded area in Fig. 2 gives the values of the reflection coefficient for dry snow having $\rho = 0.5$ g/cm^3 and a thickness of 14 cm. The triangles in the figure show the reflection coefficient R for humid snow for a horizontally polarised wave. The solid curve in Fig. 2 represents the calculated values of the reflection coefficient under the assumption that the snow layer was infinitely thick and that its permittivity is $\varepsilon = 2 + i\,0.001$ and $\rho = 0.5$ g/cm^3. Fig. 3 shows R as a function of ϑ for the wavelength of 13.6 mm, the thickness of the snow layer being 14 cm and its density 0.5 g/cm^3. The reflection coefficient for the wavelength of

Card 2/3

85980

S/141/60/003/004/005/019
E192/E382

Reflection of the Radio Waves of the Millimetre Wave Band from a Layer of Snow

8.5 mm is illustrated in Fig. 4. The reflection coefficients for dry snow, measured at λ = 4.4 mm, are indicated in Fig. 5; the upper curve gives R for a smooth snow surface, while the lower curve is for a surface whose roughness was of the same order as the wavelength. A comparison of the reflection coefficient for various wavelengths is given in Fig. 6. The dependence of R on the wavelength is shown in Fig. 7; Curve R was taken for $\vartheta = 55^{\circ}$. Fig. 7 shows also a parameter $\alpha = 2\pi a/\lambda'$, where a is the diameter of the snow particles and λ' is the wavelength in snow; α represents the scattering properties of the snow particles. The dependence of R on α is shown in Fig. 8. The work was carried out at the Institute of Radiophysics and Electronics of the AS UkrSSR during 1952.

ASSN: Inst Radiophysics & Electronics, AS Ukr.SSR

Card 3/3

USIKOV, A.Ya. [Usikov, O.IA.]; GERMAN, V.L. [Herman, V.L.]; VAKSER, I.Kh.

Absorption and scattering of microwaves in precipitations. Parts 1 and 2. Ukr. fiz. zhur. 6 no.5:618-641 S-O '61. (MIRA 14:11)

1. Institut radiofiziki i elektroniki AN USSR, g. Khar'kov.
(Precipitation(Meteorology))
(Microwaves)

42134

S/203/62/002/002/010/017
I046/1246

AUTHORS: Usikov, A. Ya. and Bliokh, P. V.

TITLE: The lens effect in the terrestrial atmosphere

PERIODICAL: Geomagnetizm i aeronomiya, v. no. 2, 1962, 293-304

TEXT: An investigation into the concentration of electromagnetic energy in the visual and the meter range by the atmosphere. Calculations are made in the geometrical-optics approximation on a spherical model with random inhomogeneities; the terrestrial magnetic field is not taken into consideration. The gain in power produced by the atmospheric lens ranges between $n \cdot 10^{\circ}$ and $n \cdot 10^{2}$. The troposphere acts invariably as a focusing lens ($n_{trop} > 1$); all energy penetrating the atmospheric lens at distances $a < a_1 = 6372$ km from the optical axis (the lower tropospheric layers, $R = 6370$ km being the radius of the earth) is refracted to meet the surface of the earth. In the ionosphere, $n_{ion} < 1$, yet any ray crossing twice the ionization maximum is deflected towards the optical axis: thus the atmosphere acts as a focusing lens in the range $a_1 < a < a_2 = 6670 - 5.427\,\lambda^2$; beyond this range, it disperses energy. The condition $a_1 = a_2$ gives the maximum critical wavelength $\lambda_{cr} \cong 7.4$ m: for $\lambda > \lambda_{cr}$, the refracted beam either meets the surface of the earth ($a < a_1 = a_2$) or is deflected away from the axis by the ionosphere ($a > a_2 = a_1$). There are 4 figures and 3 tables.

ASSOCIATION: Institut radiofiziki i elektroniki AN USSR (Institute of Radiophysics and Electronics of AS UkrSSR)

SUBMITTED: December 2, 1961

Card 1/1

USIKOV, F.F., mladshiy nauchnyy sotrudnik

Some data on the role of the nervous system in the pathogenesis of reactions occurring in transfusions of different type blood. Report no.2. Vop.perel.krovi 4:26-33 '55. (MLRA 9:12)
(NERVOUS SYSTEM) (BLOOD--TRANSFUSION)

USIKOV, F. F.

USIKOV, F. F.: "Some data on the role of the nervous system in the pathogenesis of transfusion reactions following the transfusion of blood from a different group." Khar'kov Medical Inst. Khar'kov, 1956. (Dissertations for degree of candidate in Medical Sciences).

SO: Knizhnaya letopis' No 22, 1956

T

USSR/Human and Animal Physiology. Blood. Blood Transfusions and Blood Substitutes.

Abs Jour: Ref Zhur-Biol., No 20, 1958, 93111.

Author : Usikov, F.F.
Inst : Khar'kov Scientific Medical Society.
Title : Effect of Transfusion of Heterogeneous Blood on Intensity of Cholinergic Reaction of Organism.

Orig Pub: Tr. Khar'kovsk. nauchn. med. o-vo, 1957, vyp. 7, 291-296.

Abstract: In 46 patients in 225 studies on acetylcholine (I) and 128 on cholinesterase activity (II) in the blood, I and II were studied before and after transfusion with incompatible blood (IB). I was not detected in 36 patients who had not received eserine (E) treatment

Card : 1/3

USSR/ Human and Animal Physiology. Blood. Blood Transfusions and Blood Substitutes. T

Abs Jour: Ref Zhur-Biol., No 20, 1958, 93111.

clusion about the increased formation of I in the development of transfusion reactions with Rh. A tendency toward a lowering of the activity of II was not observed in the same patients. Combined treatment by transfusion of Rh and III gave better results in cases of inflammatory infiltrates and trophic ulcers. -- A.D. Belyakova.

Card : 3/3

EXCERPTA MEDICA Sec 9 Vol 13/4 Surgery Apr 59

1802. (601) PROPHYLAXIS AND TREATMENT OF TRANSFUSION REACTIONS (Russian text) - Usikov F. F. - NOV. KHIR. ARKH. 1957, 2 (20-23)

Reactions subsequent to the transfusion of blood of the wrong group were studied. A direct correlation between the degree of severity of the reaction and the acetylcholine content of the blood was found. Following a preliminary intravenous injection of novocaine the reaction weakens. In order to prevent the occurrence of transfusion reactions the intravenous administration of 20 ml. of a 0.25% solution of novocaine is advocated. This technique was successfully used in the treatment of a developed transfusion reaction due to mismatched blood in 25 patients and after the administration of compatible blood in 43 patients. (S)

BOBROVNIK, Daniil Prokhorovich[Bobrovnyk, D.P.]; BOLDYREVA, Tat'yana Aleksandrovna[Boldyrieva, T.O., deceased]; ISHCHENKO, Anton Markovich; STRUYEV, Mikhail Ivanovich; USIKOV, Ivan Dmitriyevich[Usykov, I.D.]; KHIZHNYAKOV, Andrey Vasil'yevich [Khyzhniakov, A.V.]; SHPAKOVA, Vera Borisovna; SHUL'GA, Pelageya Lukinichna [Shul'ha, P.L.], doktor geol.-miner. nauk; CHEKHOVICH, N.Ya. [Chekhovych, N.IA.], red.; MATVIYCHUK, O.O. [Matviichuk, O.O.], tekhn. red.

[Lvov-Volyn' Basin] L'vivs'ko-volyns'kyi kam'ianovuhol'nyi basin. [By] D.P.Bobrovnyk ta inshi. Kyiv, Vyd-vo Akad. nauk URSR, 1962. 143 P. (MIRA 16:3)

1. Institut geologicheskikh nauk Akademii nauk Ukr. SSR (for Shul'ga, Ishchenko). 2. Institut geologii goryuchikh iskopayemykh Akademii nauk Ukr. SSR (for Boldyreva). 3. L'vovskiy gosudarstvennyy universitet (for Bobrovnik). 4. Ukrainskiy nauchno-issledovatel'skiy gornorudnyy institut (for Khizhnyakov). 5. Trest "Ukrvuglegeologiya" (for Struyev, Shpakova, Usikov). (L'vov--Volyn' Basin--Coal geology)

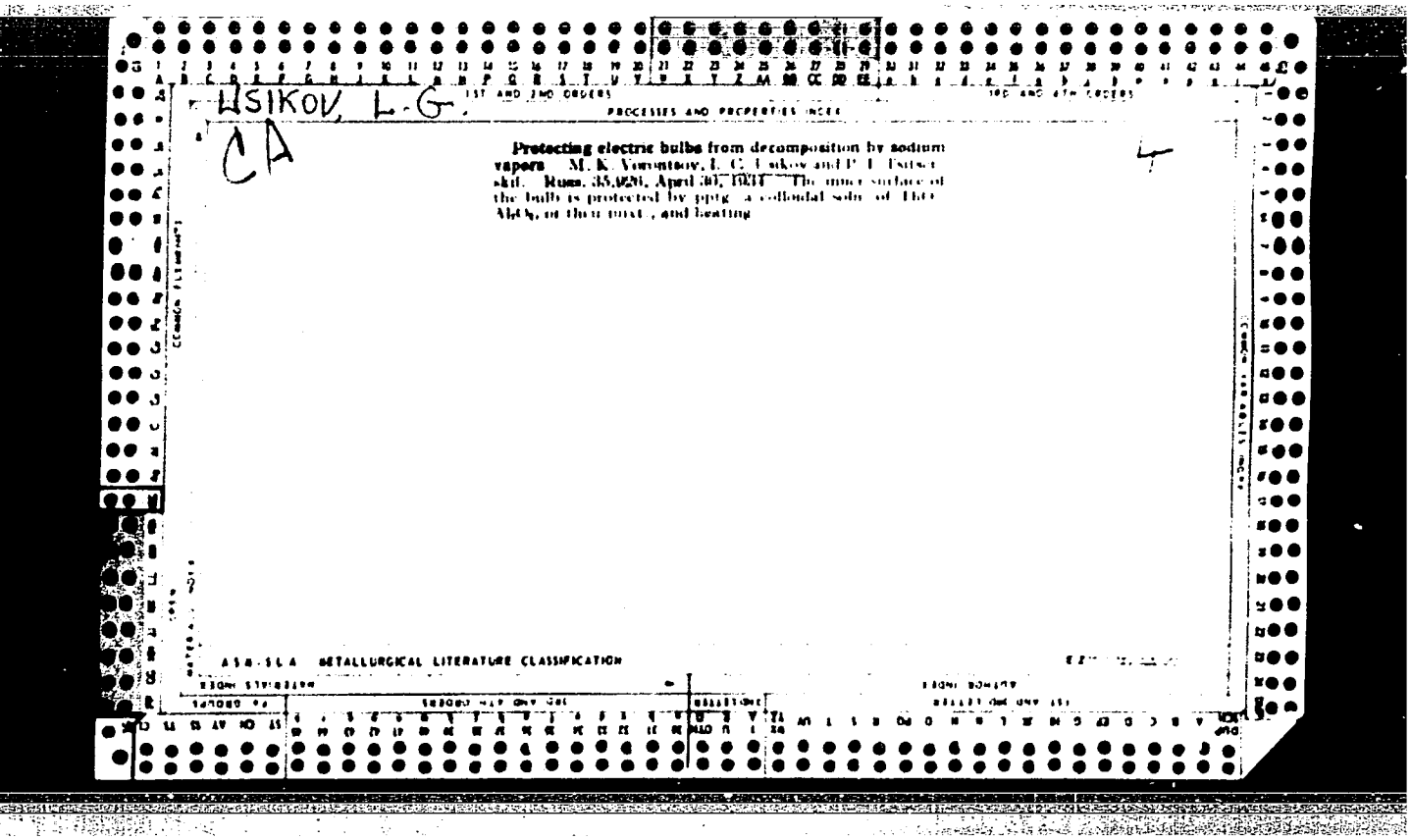
OSKOLKOV, A.I.; USIKOV, I.K.

Semiautomatic machine for burnishing holes. Mashinostroitel' no.5:14 My '63. (MIRA 16:7)

(Machine tools)

TORKHOV, A.S.; USIKOV, I.K.

Multiple machine-tool attachments for machining stopped rolls.
Mashinostroitel' no.12:16-17 D '65. (MIRA 18:12)



LISIKOV, L.-G.

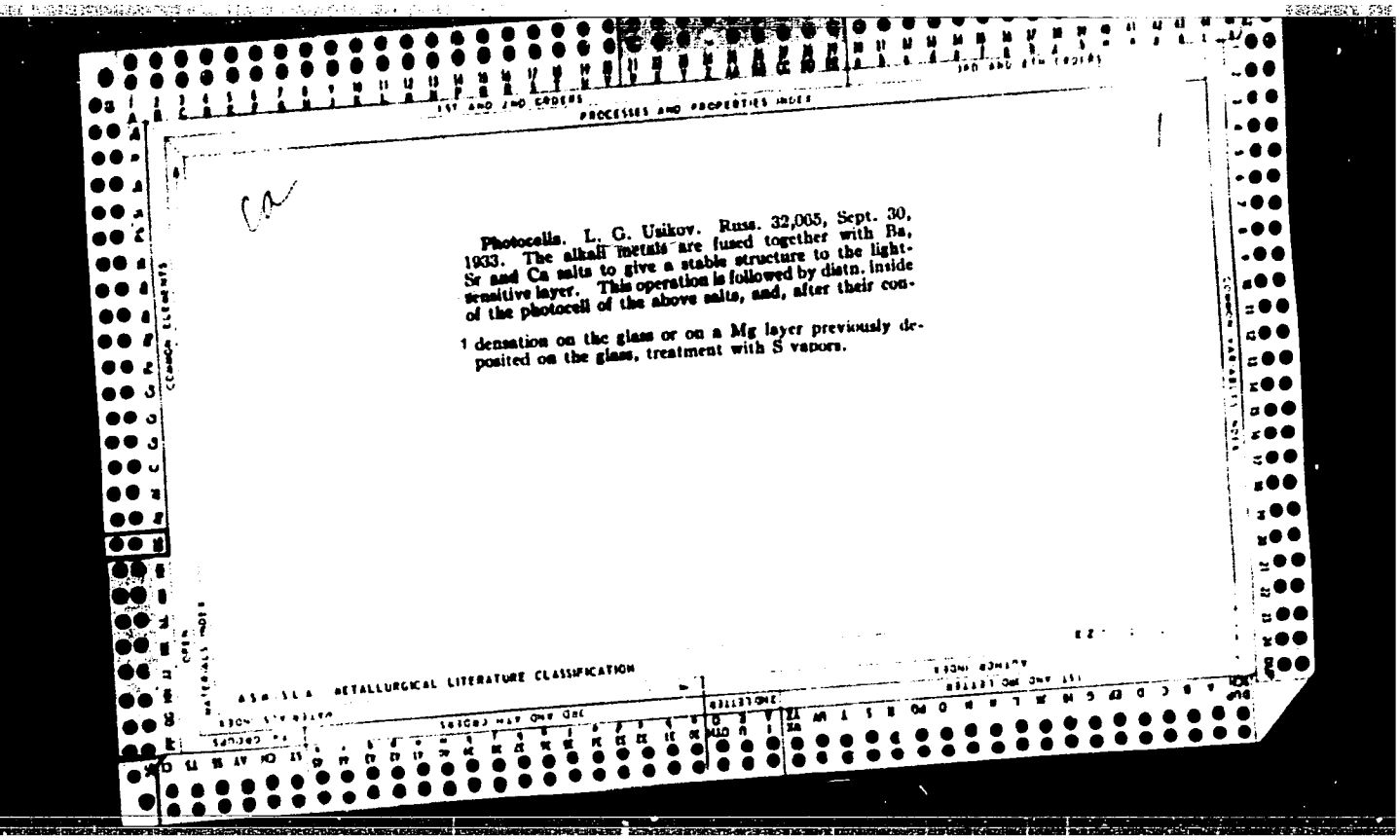
CA

4

PROCESSES AND PROPERTIES INDEX

Protecting electric bulbs from decomposition by sodium vapors M. K. Vorontsov, I. G. Lisikov and P. I. Ustinov. Russ. 35,930, April 30, 1934. The inner surface of the bulb is protected by spray. a colloidal soln. of ThO_2, Al_2O_3, or their mixt., and heating

A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION



Photocells. L. G. Usikov. Russ. 32,005, Sept. 30, 1933. The alkali metals are fused together with Ba, Sr and Ca salts to give a stable structure to the light-sensitive layer. This operation is followed by distn. inside of the photocell of the above salts, and, after their condensation on the glass or on a Mg layer previously deposited on the glass, treatment with S vapors.

USIKOV, M.P.

AID P - 2012

Subject : USSR/Electricity

Card 1/1 Pub. 27 - 16/31

Authors : Pesochin, M. I., and Usikov, M. P., Engs.

Title : Introduction of telecontrol in a power system

Periodical : Elektrichestvo, 4, 71-73, Ap 1955

Abstract : In the unified power systems of the USSR there is a three-step automatic dispatcher control: unified grid - power system - and regional network. The author advizes a far-reaching independence of action of the operating personnel in each of these stages. He describes the existing systems of dispatcher control on all three levels of operation and draws conclusions from the short period of performance as to possible results of large-scale use of remote control systems.

Institution: Dneproenergo

Submitted : O 1, 1954

18(3), 18(7) SOV/163-59-1-33/39

AUTHORS: **Wang Jun**, Livshits, B. G., Usikov, M. P.

TITLE: **Rehabilitation** Phenomena After Aging in the Alloy N36KhT (Yavleniye vozvrata svoystv posle stareniya splava N36KhT)

PERIODICAL: **Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959, Nr 1, pp 170 - 174 (USSR)**

ABSTRACT: The investigation of the non-magnetic corrosion resistant spring alloy N36KhT (Ref 1) showed that after hardening at temperatures above 900° an oversaturated solid solution was formed. A consolidation occurs if the alloy is aged afterwards. The consolidating phase is the intermediate phase of the $(Ni,Fe)_3Ti$-type with a hexagonal lattice. The electric resistance of the alloy increases in the initial stage of aging at 400-600°, and decreases at higher temperatures. This anomalous phenomenon has for the first time been discovered in Al-Cu alloys (Ref 2). The constituents of the alloy under consideration are as follows: 34.5% Ni, 12.43% Cr, 3.62% Ti, remainder Fe. The maximum increase

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of the electric resistance was found at [illegible]° and a halting time of 15 hours. If aging is carried out above 600° the electric resistance decreases reaching its minimum value at 700°. The metallographic analysis showed that the consolidating phase separates only at 500° and above. Hence it appears that during aging two processes occur in the alloy N36KhT, which, however, cannot clearly be distinguished in the temperature curve. In order to determine the nature of the process at lower temperatures the influence of cold working upon the properties of the samples was investigated. The rehabilitation phenomena were investigated after aging at 400, 450 and 500°. This effect was also ascertained with the help of a dilatometer. The investigations allow to make the following statements: The aging process in the alloy N36KhT proceeds in two stages. At 400-500° it is primarily that of a formation of the K-state, whereas at temperatures above 500 ° the $(Ni, Fe)_2Ti$-phase is primarily separated. The increase of the hardness and of the electric resistance by aging at 350-550° is basically due to the K-state. This structural state is removed by cold working. An aging at 500°

after cold working leads to a rehabilitation of this state. The anomalous rise of the electric resistance due to aging at low temperatures is apparently a result of an independent process (the formation of the K-state) and not a result of the preparation for the separation of the second phase. The incomplete rehabilitation of properties indicates that by a short-term heating to high temperatures the K-state is destroyed, whereas the separations of the second phase are stable. A comparison of the results obtained in this work with earlier results (Ref 6) shows that in N36KhT the same processes occur during aging as in Invar steel alloyed with niobium. A comparison of the aging process in alloys of the Fe-Mo-, Fe-W-, and Fe-Ni-Nb systems (Refs 6,7) with that of N36KhT indicates that the rehabilitation of properties is found in such alloys, in which an anomalous modification of properties (primarily of the electric resistance) occur in the intial stage of aging, which is connected with the formation of the K-state. There are 4 figures and 7 references, 4 of which are Soviet.

Rehabilitation Phenomena After Aging in the Alloy [illegible]

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: March 26, 1958

Card 4/4

USIKOV, M.P.; UTEVSKIY, L.M.

Transfer of plastic deformation by "relay." Fiz. met. i metalloved. 11 no.6:952-954 Je '61. (MIRA 14:6)

1. Institut metallovedeniya i fiziki metallov TSentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii.
(Deformations (Mechanics))

55330
18.9100

21393
S/032/61/027/012/004/015
B104/B108

AUTHORS: Usikov, M. P., and Utevskiy, L. M.

TITLE: Origin and interpretation of the contrast of an electron-microscopic image of a metal foil

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 12, 1961, 1481 - 1486

TEXT: The production of the diffraction contrast in an electron-microscopic image is studied. Formulas for the amplitudes of electron waves scattered by perfect and imperfect crystal lattices are derived on the basis of non-Soviet bloc papers (D. Heidenreich. J. Appl. Phys., 20, 993 (1949); N. Kato. J. Sol. Japan, 7, 397 (1952); 8, 350 (1953); M. J. Whelan, P. B. Hirsch. Phil. Mag., 2, 1121, (1957); M. J. Whelan. J. Inst. Metals, 87, 392 (1959); P. B. Hirsch, A. Howie, M. J. Whelan. Phil. Trans. Roy. Sol. of London [A], 252, 499 (1960); H. Hashimoto, A. Howie, M. J. Whelan. Phil. Mag., 5, 57, 967 (1960); G. Borrmann, Phys. Z., 42, 157 (1941); 127, 297 (1950)). The width of the image of a dislocation is estimated: $\Delta x \approx t_o'/\pi$ (t_o' = distance between two extinctions). The image of a thin metal foil (Fig. 4) is interpreted. It is shown that for studying the

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Origin and interpretation of the ...

dislocation structure of a crystal specimen, sufficiently thin parts of it may be used. As far as possible these parts should be at some distance from the edges of the foil. The properties of the individual dislocations and their interactions and motions can, however, also be observed close to the edges of the foil. It must also be borne in mind that some of the dislocations and defects remain invisible. There are 5 figures and 9 references: 1 Soviet and 8 non-Soviet.

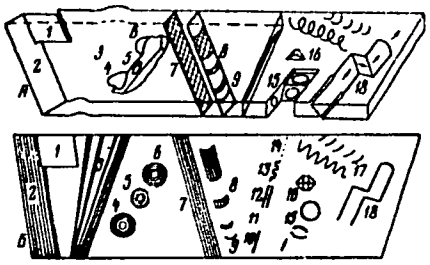
ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin)

Fig. 4. Schematic representation of the image of a metal foil under an electron microscope. Legend: (A) foil with the most essential defects; (B) image of the foil; (1) - (6) variations in thickness and inclination of the foil; (7) - (18) defects of the crystalline structure; (1) thickness variation; (2) wedge-shaped end; (3) warping of the foil; (4) depression; (5) pore; (6) hump; (7) defect of the crystal packing; (8) split dislocations with packing defects of varying widths; (9) dislocation; (10) - (14)

Origin and interpretation of the ...

long dislocation, various contrast effects; (10) ordinary dislocation; (11) invisible dislocation; (12) double image of a single dislocation; (13) zigzag dislocation; (14) dotted image; (15) dislocation loops; (16) tetrahedral packing defect; (17) helical dislocation; (18) trace of a migrating dislocation.

Fig. 4



Card 3/3

S/032/61/027/012/005/015
B104/B108

AUTHORS: Orlov, L. G., Usikov, M. P., and Utevskiy, L. M.

TITLE: Use of microdiffraction for the electron-microscopic examination of metals

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 12, 1961, 1486 - 1490

TEXT: Structural analyses of small sections of metal foils can be conducted with the adjustable elements of a modern electron microscope (intermediate lens, variable aperture, and special microdiffraction diaphragm). The method of these structural analyses is described. The application of the microdiffraction method for various purposes is demonstrated by several examples. New results are not given. G. S. Zhdanov (Rentgenografiya metallov, ch. II., Gostekhizdat (1938)) is mentioned. There are 5 figures and 6 references: 5 Soviet and 1 non-Soviet.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin)

Card 1/1

KURDYUMOV, V.G.; ORLOV, L.G.; USIKOV, M.P.

Thinning of metallic samples by electrolytic polishing for inspection by means of a transmission electron microscope. Zav. lab. 27 no. 12:1490-1494 '61. (MIRA 15:1)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I.P. Bardina.
(Metals) (Electrolyting polishing)
(Electron microscopy)

USIKOV, N.P., inzh.; RYKHAL'SKIY, Yu.A., inzh.

Effect of the parameters of a link on the fatigue strength of round-link traction chains. Vop. rud. transp. no.6:75-78 '62. (MIRA 15:8)

1. Zavod "Pobeda truda" (for Usikov). 2. Institut chernoy metallurgii AN UkrSSR (for Rykhal'skiy).
(Chains) (Mechanical wear)

34843
S/129/62/000/003/004/009
E021/E335

18.5100

AUTHORS: Usikov, M.P., Engineer and Utevskiy, L.M., Candidate of Technical Sciences

TITLE: Change in the dislocation structure of 1Kh18N9T (1Kh18N9T) steel during hardening and softening

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, no. 3, 1962, 18 - 20 + 2 plates

TEXT: Rolled samples, 0.04 mm thick were annealed in evacuated vessels at 1 100 °C and deformed by 0.3 - 10%. Some of the unannealed samples (with 96% deformation) were heated at 400 - 800 °C for 1 hour. The strip was thinned after various treatments by electrolytic polishing in a mixture of 60% H_3PO_4 and 40% H_2SO_4 at 2 - 4 A/cm^2 current density and 60 °C. The obtained 1 000 - 2 000 Å thick foil was examined by an electron-microscope. Dislocations show up because the distorted zone along a dislocation has a strong scattering effect on the electrons and the intensity of the beam decreases. Thus, dislocations show up as dark lines. It was found that the annealed

Card 1/3

Change in the dislocation ....

material had only a low density of dislocations. No dislocations were observed within the grains. Dislocations were seen only at grain boundaries with small degrees of misorientation. The density in the field of view (25 μ^2) was 10^5 cm^{-2}. Plastic deformation of 1% led to the appearance of dislocations within the grains. The calculated dislocation density was 10^9 cm^{-2}. There was only one slip system in each grain. In the case of deformation in excess of 1%, slip on secondary systems occurred. Dislocations moving on different slip planes interact with one another and the material begins to harden. The dislocation density for 2% deformation was 2×10^9 cm^{-2}. Finally, deformations greater than 8% produced a large quantity of dislocation networks; thick "clouds" of dislocations were observed inside the grains. A dislocation density of 10^{10} cm^{-2} was observed after 10% deformation. The density of dislocations after cold-rolling (96%) was difficult to determine but was obviously greater than 10^{12} cm^{-2}. Softening by heating

Card 2/3

to temperatures below the beginning of recrystallization led to no visible change in the positions and density of dislocations. Recrystallization began at 625 °C and subgrains, free from dislocations and with sharp boundaries, developed. There were no dislocations inside the grains at 700 °C and the structure in this state differed from the annealed structure only in the smaller grain size.
There are 5 figures.

ASSOCIATION: TsNIIChM

X

S/126/62/013/005/009/031
E091/E435

AUTHORS: Usikov, M.P., Utevskiy, L.M.

TITLE: Change in the dislocation structure of nickel on alloying with titanium, chromium and aluminium

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.5, 1962, 701-709

TEXT: This is the first paper on systematic investigations of the dislocation structure of nickel and its alloys, to establish the fundamental influences of elements on the behaviour of dislocations and on the nature of the dislocation structures forming during plastic deformation. Nickel and the following alloys were melted in an induction furnace and cast into ingots (composition, wt.%)

Card 1/4

Change in the dislocation ...

Alloy	Cr	Ti	Al
XH80 (KhN80)	19.70	-	-
HT4 (NT4)	-	4.25	-
HЮ4 (NYu4)	-	-	4.15
XH80T2Ю (KhN80T2Yu)	19.70	2.23	0.67
XH80T3Ю (KhN80T3Yu)	19.55	2.67	1.05

The ingots were forged into billets which were rolled, with intermediate annealing, down to a thickness of 0.03 to 0.1 mm. The strip obtained was annealed in evacuated ampules at 1000°C. The specimens were cut into two portions, one of which was deformed in tension to 0.5 - 10% at room temperature; the other portion of the Ni, KhN80, NT4 specimens was deformed in tension in a special vacuum apparatus at approximately 50°C below the recrystallization temperature of each alloy. The strips were

Change in the dislocation ...

then thinned down to 500 - 2000 Å by means of electrolytic polishing for inspection under an electron microscope. It was found that there are virtually no dislocations within the grains of nickel and its alloys in the annealed state. However, even in the early stages of work-hardening, dislocation networks form. With increase in the degree of deformation, a characteristic cellular structure forms. The distribution of dislocations in nickel changes radically by alloying it with titanium, chromium and aluminium. The behaviour of dislocations in the binary alloys KhN80, NT4 and NYu4 resembles that of dislocations in stainless steel; their movement in the early stages of deformation proceeds along strictly straight paths and, provided the foil is sufficiently uniform in thickness, the dislocation traces always form perfectly straight bands. At above 10% deformation, the structure of binary alloys becomes cellular. The above difference between the dislocation structure of nickel and its alloys is due to a decrease in the stacking fault energy on alloying nickel. This increases the width of the stacking fault, which hampers transverse slip, i.e. the transition of dislocations from one slip plane to another. The dislocation

structure of the ternary alloys KhN80T2Yu and KhN80T3Yu, after 1 to 2% deformation followed by annealing at 1000°C with subsequent air cooling, is similar to that of the binary alloys at the same degree of deformation. At higher degrees of deformation however isolated regions with very high dislocation densities become visible. The formation of dislocation is in pairs, associated with the ordering of the solid solution; the first dislocation disturbs the order and the second restores it. The dislocation structure of alloys deformed in tension at elevated temperatures differs fundamentally from that obtained by deformation at room temperature; no conglomeration of dislocations occurs at elevated temperatures. There are 12 figures and 1 table.

ASSOCIATION: Institut metallovedeniya i fiziki metallov TsNIIChM (Institute of Science of Metals and Physics of Metals TsNIIChM)

SUBMITTED: July 14, 1961

S/126/62/014/001/007/018
E111/E135

AUTHORS: Tyapkin, Yu.D., and Usikov, M.P.

TITLE: Comparison of X-ray and electron-diffraction data on the size of crystal blocks in deformed stainless steel and nickel

PERIODICAL: Fizika metallov i metallovedeniye, v.14, no.1, 1962, 85-91

TEXT: In X-ray diffraction determinations of the size of crystal blocks with the aid of analysis of the width or form of interference lines the size referred to is that of "regions of coherent scattering". The question arises as to whether this characterises a dimension of the crystal structure or is associated with an optical effect. To solve this problem the authors have compared X-ray results with those of electron microdiffraction from thin foils of the test samples, simultaneous electron-microscopic investigation of these foils being carried out. The samples studied were of an 18-8 type stainless steel and pure nickel, subjected to cold-rolling with 96% reduction combined with heat treatment and, where appropriate, electrolytic thinning. Some

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Comparison of X-ray and electron- ... S/126/62/014/001/007/018
E111/E135

electron microscopic pictures (generally at 15000 magnification) were also obtained. The authors conclude that, allowing for systematic errors, the block-size determinations by electron- and X-ray diffraction give practically the same values. The greatest difference is with nickel, probably because the foil thickness could not be determined with sufficient accuracy. Thus, for deformed stainless steel and pure nickel the dimensions of coherent-scattering regions found from measurements of X-ray interference-line width determination correspond to dimensions of real crystal blocks having a relatively correct internal structure and disorientated relative to each other.
There are 2 figures and 2 tables.
ASSOCIATION: Institut metallovedeniya i fiziki metallov TsNIIChM (Institute of Science of Metals and Physics of Metals, TsNIIChM)

SUBMITTED: October 18, 1961

Card 2/2

S/053/62/076/001/003/004
B117/B101

AUTHORS: Orlov, L. G., Usikov, M. P., Utevskiy, L. M.

TITLE: Electron-microscopic examination of dislocations in metals

PERIODICAL: Uspekhi fizicheskikh nauk, v. 76, no. 1, 1962, 109 - 152

TEXT: This is a survey on results achieved by applying electron microscopy to the observation of dislocations in metals. First, the principles of the investigation method are dealt with: Type of specimens to be used, procedure of observation, electron-microscopic representation of defects in crystalline structure, formation of diffraction contrasts. In the following, the principal results obtained as to the formation of dislocations, their motion and interaction, structure of deformed metal and solidification, dislocations and point defects, general and specific data as to the structure of thin foils are given. The authors point out that the theory of dislocations and numerous predictions as to particular properties of defects have been confirmed experimentally during the last 5 years by using transmission beam microscopes for the direct examination of the dislocation structure. In this connection, it is stressed that

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the development of the contrast theory and further improvements in the design of electron microscopes are of utmost importance. The improvements referred to involve: fitting the microscope with a goniometer stage for determining the direction of Burgers vectors; improving the methods of heating, cooling and deforming the specimens during observation; use of electrons of more than 100 kev for the observation of dislocations in specimens made as thick as possible; fitting the microscope with an ion gun housed in the camera for periodic or continuous purification of the specimen during the examination. V. G. Kudryumov is mentioned. There are 38 figures, 2 tables, and 111 references: 7 Soviet and 104 non-Soviet. The four most recent references to English-language publications read as follows: J. Washburn, G. W. Croves, A. Kelly and G. K. Williamson, Philos. Mag., 1 (1961); P. B. Price, Philos. Mag. 6, 449 (1961); N. F. Mott, Trans. Met. Soc. AIME 218, 962 (1960); H. Fujita, J. Phys. Soc. Japan, 16, 397 (1961).

35728
S/020/62/143/002/012/022
B104/B102

18.1750

AUTHORS: Osip'yan, Yu. A., and Usikov, M. P.

TITLE: Quenching defects in a solid nickel-aluminum solution

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 2, 1962, 319 - 322

TEXT: Disks 15 to 20 mm in diameter were made of cold-rolled nickel-aluminum foils of 30μ thickness and annealed in vacuo at 1000°C for 8 hr. Subsequently, they were heated again in vacuo up to 400°C and quenched in oil. The diameter of the disks was reduced to about 1000 Å by electrolytic polishing. The foils were examined under an UEMB-100 (UEMB-100) electron microscope at an accelerating voltage of 75 kv, and a beam diameter of less than 10μ. Prismatic dislocation loops were detected, which are taken as an indirect indication of the relatively high energy of packing defects. From a detailed analysis of the specific features of the structure observed it is concluded that the dislocation loops produced by rapid cooling act as sources of dislocations. The resulting dislocations move along the glide planes. Some of them appear on the surface while others act on the gliding system, interact with other

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dislocations, and form stable dislocation grids or barriers of the type of sessile dislocations. This mechanism causes considerable fields of elastic stresses in the glide planes, which impede the movement of domain boundaries during magnetization or when applying external elastic stresses, lead to the occurrence of the ΔE effect, and change the magnetic properties. L. M. Utevskiy is thanked for valuable comments. There are 3 figures and 12 references: 7 Soviet and 5 non-Soviet. The four most recent references to English-language publications read as follows: P. B. Hirsch, J. Inst. Met., 87, 406 (1959); R. E. Smallman, K. H. Westmacott, G. A. Coiley, J. Inst. Met., 88, 127 (1959 - 1960); G. Thomas, Phil. Mag., 4, 1213 (1959); G. T. Fourie, H. Wilsdorf, J. Appl. Phys., 31, no. 12, 2219 (1960).

ASSOCIATION: Institut metallovedeniya i fiziki metallov Tsentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii im. I. P. Bardina (Institute of Science and Physics of Metals of the Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin)

X

Quenching defects in a solid... S/020/62/143/002/012/022
B104/B102

PRESENTED: October 25, 1961, by G. V. Kurdyumov, Academician

SUBMITTED: October 20, 1961

Card 3/3

S/181/63/005/001/016/064
B102/B186

AUTHORS: Usikov, M. P., and Utevskiy, L. M.

TITLE: Electron microscopic study of the polygonization in nickel and Ni-Cr alloys

PERIODICAL: Fizika tverdogo tela, v. 5, no. 1, 1963, 100-107

TEXT: The changes that occur in the dislocation structure when a material which has been elongated 5% is heated were studied on 30-50μ foils of nickel and nichrome using electron microscopes of the types UEMB-100 (UEMB-100) and JEM-6A. It was found that owing to the polygonization a hexagonal and sometimes a polygonal dislocation network is formed. The differences in the polygonal dislocation structure of Ni and Ni-Cr must be ascribed to the primary differences in the dislocation distributions. They are connected with a decrease in the energy consumed in the destruction of the packing when Ni is alloyed with Cr. Before their elongation all the specimens were heated to 1000°C in vacuo. After the elongation they were heated again, viz. nickel to 400-900, Ni-Cr to 600-1100°C, and were kept at these temperatures during periods of from

10 sec to 100 hrs. Conclusions: After 0.5 - 1 hr polygonization is practically completed in Ni at 700°C and in Ni-Cr at 900°C. It can be concluded that ascending character of the dislocations is rendered more difficult in Ni-Cr. This can, however, not be attributed to a hindered selfdiffusion but to the large width of the split dislocations which increases with temperature. In regions where one slip system with dislocations with one sign are effective, polygonization takes place according to the Mott scheme. If several slip systems are effective simultaneously, a dislocation network is formed on polygonization: in Ni-Cr it is a plane, mainly hexagonal network, in Ni it is a less regular spatial network which may partly be plane. There are 6 figures.

ASSOCIATION: Institut metallovedeniya i fiziki metallov TsNIIChM, Moskva (Institute of the Science of Metals and Physics of Metals of TsNIIChM, Moscow)

SUBMITTED: July 20, 1962

USIKOV, M.P.; UTEVSKIY, L.M.

Direct observation of the interaction of dislocations with particles of the second phase. Zav.lab. 29 no.8:944-948 '63.
(MIRA 16:9)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni I.P.Bardina.
(Alloys—Metallography)

L 17536-63 EWP(q)/EWT(m)/BDS AFFTC/ASD Pad JD/HM

ACCESSION NR: AP3004422 S/0020/63/151/004/0833/0836

AUTHORS: Roytburd, A. A.; Usikov, M. P.

TITLE: Formation of flat hexagonal nets during polygonization

SOURCE: AN SSSR. Doklady*, v. 151, no. 4, 1963, 833-836

TOPIC TAGS: metallurgy, nets formed during steel polygonization, polygonization of an alloy, nickel, chromium, nichrome alloy

ABSTRACT: The authors showed in an earlier paper (Fiz. tverd. tela, 5, No. 1, 1963, 100) that, when a slightly-deformed nichrome alloy (Ni + 20% Cr) is heated, the dislocations form pile-ups in the slip planes with formation of flat, hexagonal dislocation nets. In this work, a more detailed electron microscopic investigation of their formation during polygonization was carried out. During tempering at 900C, the nets appear after 5 min. The process of formation is completed after 30 minutes. The nets disappear upon further tempering for 1 hour. A possible mechanism of the phenomenon is suggested, and the

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L 17536-63

ACCESSION NR: AP3004422

2

activation energy is estimated to 15 kcal/mole. "We express our gratitude to L. M. Utevskiy for a useful discussion of the work." Orig. art. has: 4 figures, 1 table and 6 equations.

ASSOCIATION: Institut metallovedeniya i fiziki metallov Tsentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii im. I. P Bardina (Institute for Metallography and Physics of Metals of the Central Scientific-Research Institute for Ferrous Metallurgy).

SUBMITTED: 18Feb63 DATE ACQ: 21Aug63 ENCL: 00

SUB CODE: PH, ML NO REF SOV: 003 OTHER: 004

Card 2/2

ROYTBURD, A. L.; USIKOV, M. P.; UTEVSKIY, L. M.

"On the creep mechanism of nickel and its alloys."

report submitted for 3rd European Regional Conf, Electron Microscopy, Prague, 26 Aug-3 Sep 64.

ROYTBURD, A.L.; RUTBERG, V.P.; USIKOV, M.P.; UTEVSKIY, L.M.

Microstresses in polycrystals. Fiz. tver. tela 6 no.1:320-322 Ja '64. (MIRA 17:2)

1. Institut metallofiziki, Moskva.

ACCESSION NR: AP4013094 S/0126/64/017/001/0063/0072

AUTHOR: Gorelik, S. S.; Usikov, M. P.

TITLE: Study of the process of formation of recrystallization embryos

SOURCE: Fizika metallov i metalloved., v. 17, no. 1, 1964, 63-72

TOPIC TAGS: recrystallization, recrystallization embryo, metal crystallization, aluminum crystal structure, nichrome crystal structure, fluctuation theory

ABSTRACT: By the term "recrystallization embryos", the authors refer here to regions of any size with an undistorted lattice formed during heating which are surrounded by a deformed matrix and entirely or partially separated from the matrix by large-angle boundaries. The authors studied the mechanism of the formation of these recrystallization embryos during heating after small, but supercritical, degrees of deformation, in order to determine whether formation occurs through fluctuation or whether such embryos are definite lattice regions already existing in the deformed state, as well as to clarify the atomic mechanism of the process. The results were not in agreement with the fluctuation theory of embryo-formation. The embryos were found to be formed from definite regions of deformed crystallites through a redistribution of dislocations, leading to the formation of dislocation boundaries and to the partial annihilation of the dis-

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ACCESSION NR: AP4013094

locations. This redistribution is of a different character than in the case of polygonic formation. The authors also analyzed, in addition to the sites of origin of the embryos, their form, orientation, and boundary structure, as well as the speed and direction of boundary dislocation during the initial stages of primary recrystallization. Tests were conducted on aluminum in polarized light and on nichrome (13% Cr) under a conventional and electron microscope. The results of the study lend weight to the hypothesis that the cause of accelerated diffusion in the case of primary recrystallization is the formation of free mobile vacancies in the redistribution process and the annihilation of dislocations in the formation of recrystallization embryos. "The authors wish to express their gratitude to L. M. Utevskiy for his help in carrying out the electron microscope study of the thin foil." Orig. art. has: 7 figures.

ASSOCIATION: Institut stali i splavov, Institut metallovedeniya i fiziki metallov TsNIIChM (Institute of Steel and Alloys, Institute of Metallurgy and Physics of Metals of the TsNIIChM)

SUBMITTED: 25Feb63 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: ML, PH NO REF SOV: 009 OTHER: 008

Card 2/2

L 17688-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b) Pad IJP(c)/AFWL/SSD/ASD(f)-2/ASD(m)-3/AFETR JD/HW

ACCESSION NR: AP4049484 S/0020/64/159/002/0317/0320

AUTHORS: Roytburd, A. L.; Usikov, M. P.; Utevskiy, L. M.

TITLE: On the mechanism of plastic deformation in stationary creep of metals

SOURCE: AN SSSR. Doklady*, v. 159, no. 2, 1964, 317-320, and insert facing p. 318

TOPIC TAGS: plastic deformation, creep, dislocation study, dislocation motion, nickel alloy

ABSTRACT: An electron-microscopic study was made of the dislocation structure produced during the creep process. The purpose of the study was to check whether nonconservative dislocation motion can actually be neglected in the case of high temperatures and low stresses. The object of investigation was an alloy of nickel with 20% Cr, 1.2% Ti, and 0.6% Al. Annealed ribbon specimens (0.05 mm

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thick) were deformed under creep conditions at 700C in vacuum. To fix the dislocation structure, the samples were unloaded only after total cooling. The samples were then electrolytically polished and observed in a JEM-6A electron microscope at 80 and 100 kV accelerating voltage. The main elements observed after creep are helicoidal dislocation whose shape is distorted by the plastic deformation. This dislocation has an appreciable velocity of nonconservative motion, giving rise to a plastic deformation rate of 10^{-5}--10^{-6} sec^{-1}. It is concluded that in contrast to earlier opinions, a considerable fraction of the deformation, if not all, in high-temperature stationary creep is the result of nonconservative motion of helicoidal dislocations, limited by closed self-diffusion flow. The origin of the dislocations calls for additional study. This report was presented by G. V. Kurdyumov. Orig. art. has: 3 figures and 4 formulas.

ASSOCIATION: Institut metallovedeniya i fiziki metallov Tsentral'-

L 17688-65
ACCESSION NR: AP4049484

nogo nauchno-issledovatel'skogo instituta chernoy metallurgii (Institute of Metal Research and Metal Physics, Central Scientific Research Institute of Ferrous Metallurgy)

SUBMITTED: 07May64 ENCL: 00

SUB CODE: MM, SS NR REF SOV: 004 OTHER: 002

Card 3/3

L 51988-65 EWT(m)/T/EWA(c)/EWP(b)/EWA(d)/EWP(t)/EWP(w) IJP(c) JW/JD
ACCESSION NR: AT5011205 UR/[illegible]/64/000/008/0077/0100

AUTHOR: Usikov, M. P.; Utevskiy, L. M.

TITLE: Electron microscope investigation of the dislocation structure of nickel and its alloys

SOURCE: Dnepropetrovsk. Institut metallovedeniya i fiziki metallov. Problemy metallovedeniya i fiziki metallov, no. 8, 1964, 77-100

TOPIC TAGS: dislocation structure, metal mechanical property, electron microscope, cold working, hot working, metal deformation, polygonization development, activation energy, metal creep, nickel, nichrome, nickel base alloy, nickel containing alloy, chromium containing alloy, titanium containing alloy, aluminum containing alloy

ABSTRACT: The nickel alloys investigated were KhN80 (19% chromium), NT4 (4.25% titanium), NYu4 (4.15% aluminum), KhN80TYu (19.85% chromium, 1.17% titanium, 0.60% aluminum), KhN80T2Yu (19.70% chromium, 2.23% titanium, 0.67% aluminum). Forged billets were partly rolled into ribbon 0.03-0.1 mm and the remaining part was used for

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L 51988-65
ACCESSION NR: AT5011205

mechanical tests. The ribbon was cut into samples 150 mm long which were annealed at 1,000°C (air cooling). Plastic deformation of the samples was done by extension of 1-15% on a conventional non-continuous machine. High temperature deformation was carried out in vacuum and deformation with time was recorded. Microhardness (HV), yield point ($sigma_{0,2}$), and the strength limit were determined. Foil with a thickness of 1,000-2,000 Å was prepared for examination with an electron microscope type UEMB-100 or IGEM-6A. The dislocation structure formed by cold working was investigated. At a sufficiently large degree of deformation (beta greater than 10%) the structure of binary alloys becomes cellular, similar to the structure of nickel under the same deformations. Investigations of the dislocation structure of the two-phase alloy KhN80T2Yu are presented in detail. The redistribution of dislocations during polygonization was investigated. Experiments on polygonization were made on pure nickel and nichrome after cold working with an extension of 5%. Subsequent heating did not cause recrystallization. The activation energy of the process was about 15 kcal/mole. Also investigated were the special characteristics of the behavior of dislocation during slow high temperature deformation. A study was made of the dislocation

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L 51988-65
ACCESSION NR: AT5011205

structure in the creep process using previously annealed samples of pure nickel and alloy KhN80TYu and samples of alloy KhN80T2Yu aged at 850°C for 10 hrs. Orig. art. has: 9 formulas, 28 figures, 2 tables.

ASSOCIATION: Institut metallovedeniya i fiziki metallov, Dnepropetrovsk (Institute of Physical Metallurgy and Physics of Metals)
SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NR REF SOV: 010 OTHER: 015

Card 3/3

L 33248-65 [illegible]/ETI IJP(c) JD/HW/JG

ACC NR: [illegible]

SOURCE CODE: UR/0058/65/000/011/E045/E045

AUTHOR: Usikov, M. P.; Utevskiy, L. M.

TITLE: Electron-microscope investigation of the dislocation structure of nickel and its alloys

SOURCE: Ref. zh. Fizika, Abs. 11E349

REF SOURCE: Sb. tr. In-t metalloved. i fiz. metallov Tsentr. n.-i. in-ta chernoy metallurgii, vyp. 36, 1964, 77-100

TOPIC TAGS: nickel, nickel alloy, crystal dislocation, [redacted], metal hardening, crystal defect, plastic deformation, creep/ [redacted]

ABSTRACT: By direct transmission the authors investigated in an electron microscope the influence of alloying of Ni on the character of its dislocation structure produced during the course of hardening under different conditions of plastic deformation, thermal loss of hardness, and under creep conditions. Alloying with Ti, Cr, and Al leads to a decrease in the energy of the stacking faults (γ), which is manifest in the appearance of flat clusters of dislocations in the single-phase alloys (at small degrees of deformation). It is shown that during the earlier stage of aging (alloy of the "nimonik" type) the dislocations cut through particles of the second phase, whereas the larger particles which are produced during the later aging stage are circuited by the dislocations. Upon polygonization one observes the formation of more or less regular hexagonal grids of dislocations. In creep, prismatic loops of

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APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001858130004-1"

L 33248-66

ACC NR: AR6016226

dislocations and helicoidal dislocations are produced. Possible causes of the hardening by alloying (including a two-hase alloy), the mechanism of polygonization, and creep are discussed in light of the results. M. Usikov. [Translation of abstract]

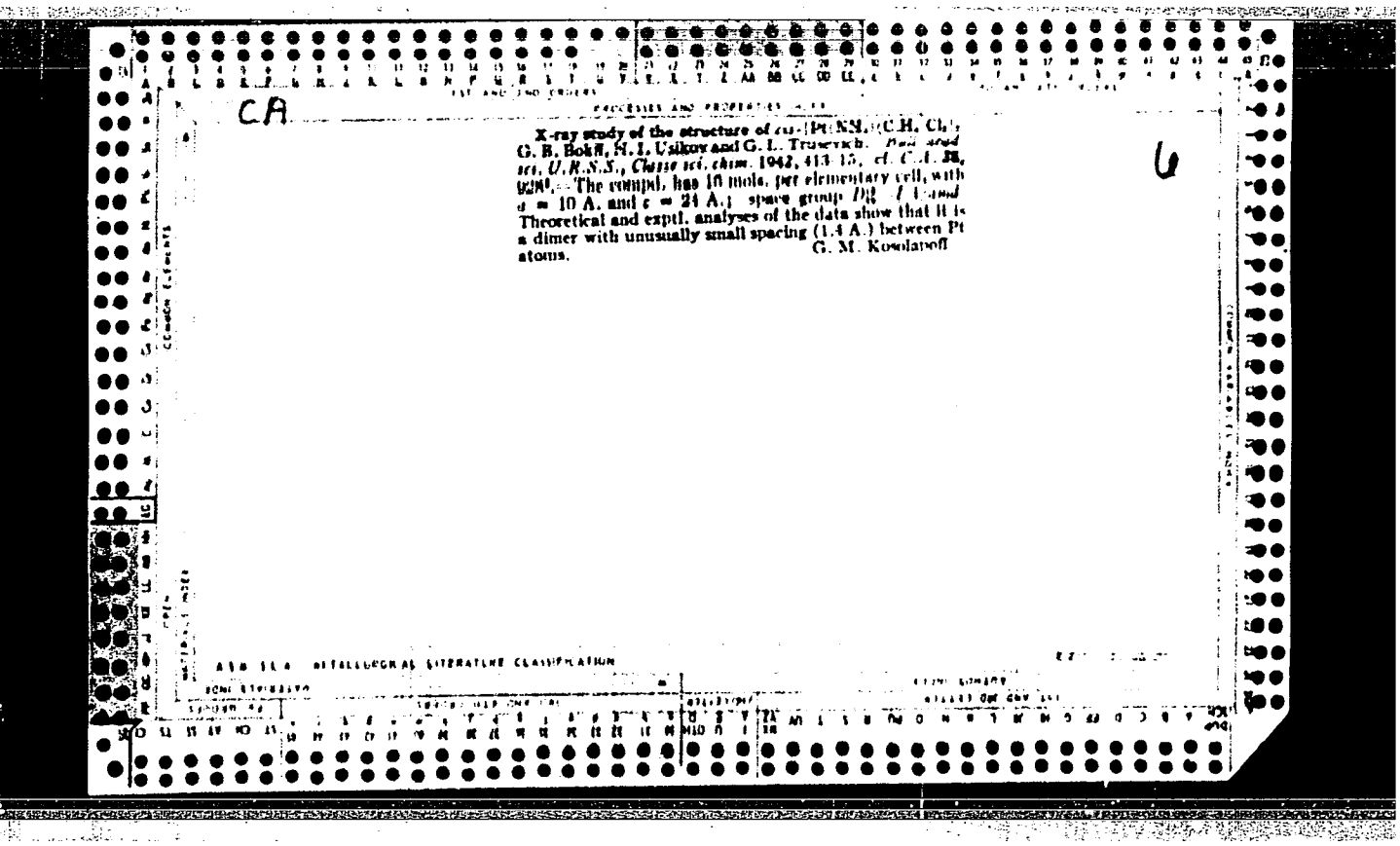
SUB CODE: 20

Card 2/2

VNUKOV, Sergey Alekseyevich; ZAKHARIK, Ye.; USIKOV, N.

[Orel economic region] Orlovskii ekonomicheskii administrativnyi raion. Orel, Orlovskoe knizhnoe izd-vo, 1959. 78 p. (MIRA 13:8)

(Orel Province--Economic conditions)



CA

X-ray study of the structure of cu-[Pt(NH3)2Cl2]. G. B. Bokii, N. I. Usikov and G. L. Truevich. *Doklady Akad. nauk, U.R.S.S., Chimie tech. chim.* 1942, 413-15; cf. *C.A.* 38, 6280.—The compd. has 16 mols. per elementary cell, with $a = 10$ A. and $c = 24$ A.; space group D_{4h}^{17} $I4_1/amd$. Theoretical and exptl. analyses of the data show that it is a dimer with unusually small spacing (1.4 A.) between Pt atoms.
G. M. Kosolapoff

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RABINOVICH, A.N.; GREBEN', Yu.I., red.; USIKOV, N.N., inzh., red.izd-va; BARDINA, A.A., tekhn. red.

[What one should know about program-controlled machine tools] Chto nuzhno znat' o metallobrabatyvaiushchikh stankakh s programmnym upravleniem. Moskva, Mashgiz, 1963. 112 p. (MIRA 17:1)

PLYATSKIY, V.M.; USIKOV, N.N., inzh.

[Liquid metal forging] Shtampovka iz zhidkogo metalla. Moskva, Izd-vo "Mashinostroenie," 1964. 314 p. (MIRA 17:4)

USIKOV, N.P.; MARCHEVSKIY, G.I.

Automatic heating and bending machine. Biul.tekh.-ekon.inform. no.5:31-32 '59. (MIRA 12:8)
(Hydraulic presses)

ALSHINBAYEV, M.R.; AMELIN, V.P.; ANDRIANOVA, O.V.; GASIYEV, Zh.; DEGRAF, G.A.; INKARBEKOV, A.B.; KOLOMYTSEV, I.V.; KOLTUSHKIN, I.S.; MALAKHOV, V.P.; MONASTYRSKIY, A.O.; REZNIKOV, B.M.; SAKHAROV, I.V.; SENNIK, V.K.; SOSNIN, V.A.; SURKO, V.I.; SURKOV, Ye.P.; SYRLYBAYEV, S.N.; USIKOV, N.V.; UCHAYEV, A.F.; SHESTOPALOV, Ye.V.; SHERMAN, R., red.; GOROKHOV, L., tekhn. red.

[Study manual for a machinery operator] Uchebnik-spravochnik mekhanizatora. Alma-Ata, Kazsel'khozgiz, 1963. 326 p. (MIRA 16:12)

1. Alma-Ata, Kazakhskiy gosudarstvennyy sel'skokhozyaystvennyy institut. Fakul'tet mekhanizatsii. 2. Sotrudniki fakul'teta mekhanizatsii Kazakhskogo gosudarstvennogo sel'skokhozyaystvennogo instituta (for all except Sherman, Gorokhov). (Agricultural machinery)

USIKOV, O. [Usykov, O.] (Khar'kov)

Ionosphere of the earth as a lens of a radiotelescope. Nauka i zhyttia 11 no.3:4-5, 24 Mr '62. (MIRA 15:8)

1. Chlen-korrespondent AN UkrSSR.
(Telescope, Radio) (Ionosphere)

ZHMUDSKIY, O. [Zhmuds'kyi, O.], doktor fiz.-matem.nauk, prof.; USIKOV, O. [Usykov, O.]; SAMARSKIY, S. [Samars'kyi, S.], kand.biolog.nauk

Editor's mail. Nauka i zhyttia 12 no.11:54-55 N '62.
(MIRA 16:1)

1. Chlen-korrespondent AN UkrSSR (for Usikov).
(Science--Miscellanea)

30330

S/185/61/006/005/006/019
D274/D303

3.5133
9.9822

AUTHORS: Usikov, O.Ya., Herman, V.L., and Vakser, I.Kh.

TITLE: Study of absorption and scattering of millimeter waves by precipitations. I, II

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 6, no. 5, 1961, 618 - 640

TEXT: Experimental results are given on the attenuation of millimeter (8.15 to 2.7) radiowaves by rain, as well as basic theoretical results concerning absorption and scattering of such waves by precipitations. In the theoretical investigation, one has to proceed from a rigorous solution of the pertinent electrodynamical equations, taking into account the dispersion of the complex dielectric constant of water in the millimeter range. If the values for the absorption and the effective scattering cross-section for the individual particles are known, as well as the distribution function (of drop-size), then the total absorption and scattering can be found for precipitations with particles of similar or dis-

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similar size. The change in wave-intensity as a function of distance, due to absorption and scattering by precipitations, is expressed by

$$I = I_0 e^{-x\sum_i N_i Q^n(D_i, \lambda)},$$

where N_i - the number of particles with diameter D_i per unit volume, Q - the effective cross-section of attenuation. The attenuation due to rain, expressed in decibels per kilometer, is

$$\gamma = 0{,}434 \sum_i N_i \left(\frac{1}{cm^3}\right) Q^n [D_i(cm),\ \lambda(cm)]. \qquad (1)$$

The experimental investigation proceeded from Eq. (1). As inaccurate determination of N_i may be a chief source of errors, special attention was given to the structure and distribution of rain drops. The method adopted, ensured greater accuracy of measurements over a short track. The field studies were carried out (in 1951-1952) in the neighborhood of Batum, a region with very frequent

precipitations (and of varying intensity). Experimental data on the drop-size distribution were obtained by the well-known method of fixation by means of filter paper. A comparison of samples showed that the size-distribution differs greatly and therefore, the attenuation cannot be uniquely determined from the intensity of the waves. At the same time, data were collected on the distribution of particles according to N_i needed for a comparison of theoretical and experimental values. A figure shows the experimental setup used for attenuation measurements. A klystron was used as a generator. High-frequency elements - waveguides, wave-detectors, etc., were developed to meet the requirement of detecting slight signal-variations. The setup could be used in two ways for detecting wave-attenuation: Either by measuring the signal after it traversed the track once, or after a double passage. The second method involves the reflection of the signal and is more reliable, in particular with light rain. An absorption track of 50-100 m was used; hence, the sensitivity of the setup had to be very high (so as to measure variations of the order of a hundredth part of a decibel). Such a degree of sensitivity was obtained by compen-

30330

S/185/61/006/005/006/019
D274/D303

Study of absorption and scattering ...

sation of the measured signals. A figure shows a diagram of a bridge circuit with two detectors which work by the method of the reflected signal. The rain intensity was measured by means of raindrop meters. The principal measuring device was a waveguide attenuator, used for checking the sensitivity and for graduating the indicator scale of the bridge circuit. About 2000 measurements of attenuation were taken. The above setup was used for a wavelength $\lambda = 8.15$ mm. For the other wavelengths, the set[illegible] was slightly modified. Thus, in the case of $\lambda = 6.8$ mm, a magnetron was used as a generator. Figures show plots of absorption versus rain-intensity for the various wavelengths. The theoretical investigation of attenuation, due to atmospherical inhomogeneities, is considerably simplified if the size of the particles is considerably smaller than the wavelength, i.e. $D/\lambda \ll 1$. This inequality holds (in the millimeter range) for storms, clouds, industrial smole, etc. Hence the problem can be solved in the Rayleigh approximation, i.e. the solution of the wave equation is obtained by solving the Laplace equation. The generalized Rayleigh formula for attenuation is

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$$\gamma_I = 0{,}434\frac{\pi D^2}{4}\sigma_1, \qquad (3)$$

where $\sigma_1 = 2\rho c_1\left(1+\frac{c_2}{c_1}\rho^2+\frac{c_3}{c_4}\rho^3+\dots\right)$;

for radar reflections:

$$\gamma_{II} = 0{,}434\frac{\pi D^2}{4}\sigma_2, \qquad (4)$$

where $\sigma_2 = A_1\rho^4\left(1+\frac{A_2}{A_1}\rho^2+\frac{A_3}{A_1}\rho^3+\dots\right)$.

The coefficients of these equations are listed in tables. The difficulties in obtaining exact solutions for these equations can be overcome by means of recursion formulas, (for the coefficients a_n and b_n which enter the expressions for the absorption cross-section Q^I and scattering cross-section Q^{II}). Tables list the values

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Study of absorption and scattering ...

for Q^{I} and Q^{II}. In the general case

$$\gamma' = \sum_i N_i \left(\frac{1}{cm^3}\right) Q_i'(cm^2)\, 10^6 \frac{d\sigma}{km} \qquad (5)$$

and

$$\gamma'' = \sum_i N_i \left(\frac{1}{cm^3}\right) Q_i''(cm^2) \cdot 10^6 \frac{d\sigma}{km}. \qquad (6)$$

From the tabulated values for Q^{I}, Q^{II}, and the experimentally obtained values of N_i, it is possible to determine the attenuation and the scattering by means of formulas (5) and (6). For N_i, one obtains

$$N_i = \frac{q_i}{v_i st} = \frac{q_i I\left(\frac{\mu m}{2\sigma\delta}\right)}{6\pi v_i \sum_i q_i D_i^2 (\mu m)}. \qquad (8)$$

By virtue of Eq. (5) and (8), one obtains

$$\gamma' = \sum_i 10^6 N_i \left(\frac{1}{cm^3}\right) Q_i'(cm^2) = \frac{I\left(\frac{\mu m}{2\sigma\delta}\right) \sum_i \frac{q_i Q_i'}{v_i}}{6\pi \sum_i q_i D_i^2 (\mu m)} \cdot 10^6. \qquad (9)$$

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If the rain drops are of the same size, then

$$\gamma_{\bar{D}} = \frac{I\left(\frac{\mu\mu}{zo\partial}\right) Q^{I}(D, \lambda)}{6\pi v(\bar{D})\,\bar{D}^{3}(\mu\mu)}, \qquad (10)$$

Hence, the attenuation and the radar reflection of millimeter waves do not depend on rain intensity only, but also on the drop-size distribution. Four numerical examples are given which show that the values calculated by formulas (5) and (9) give a true picture of absorption and scattering of millimeter waves by precipitations over the entire millimeter-range. There are 5 figures, 29 tables and 4 references: 2 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: Van Vleck, Phys. Rev. 71, 413, 1947; 71, 425, 1947; Langmuir, Journ. of Meteor., 5, 175, 1948.

ASSOCIATION: Instytut radiofizyky ta elektroniky AN URSR m. Kharkiv (Institute of Radiophysics and Electronics, AS UkrSSR, Kharkiv)

SUBMITTED: January 7, 1961

Card 7/7

USIKOV, P.

Collective Farms

Use of the land on the collective farm. Kolkh. proizv. 12, No. 3, 1952

9. Monthly List of Russian Accessions, Library of Congress, June 1953. Unclassified.

USIKOV, P.

Land tenure

Use of the land on the collective farm. Kolkh. proizv., 12, No. 3, 1952.

9. Monthly List of Russian Accessions, Library of Congress, June 1952, Uncl.

USIKOV, P.

UDACHIN, S., prof.; USIKOV, P., inzh.-zemleustroitel'.

In hand of the real owner. Nauka i pered. op. v sel'khoz. 7 no.11: 38-40 N '57. (MLRA 10:11)

(Land tenure)

MA

3 Structure

***X-Ray Examination of Electrolytic Zinc Coatings.** P. [illegible] (Zinc Product. Assoc. *J. Applied Chem.*, 1939, 12, (1), 176–179). [illegible] A selection of specimens of electrodeposited zinc coatings obtained by previous investigators have been examined by the X-ray reflection method. Coatings on iron obtained from 1.5 and 2.5 zinc sulphate solutions (0·03 amp. cm.$^{-2}$, 25° C.), with or without additions of boric acid, were found to possess orientation of the [103] axes. Under the same conditions but with additions of sulphuric acid or aluminium sulphate, [001] orientation was observed. Coatings obtained from solutions containing additions of sodium or magnesium sulphate showed no orientation. A zinc coating on the first 2.5 zinc sulphate solution had [111] orientation. The formation of coatings with [001] orientation from solutions containing aluminium sulphate is regarded as of interest in connection with the possibility of the bright plating of zinc.—A. B.

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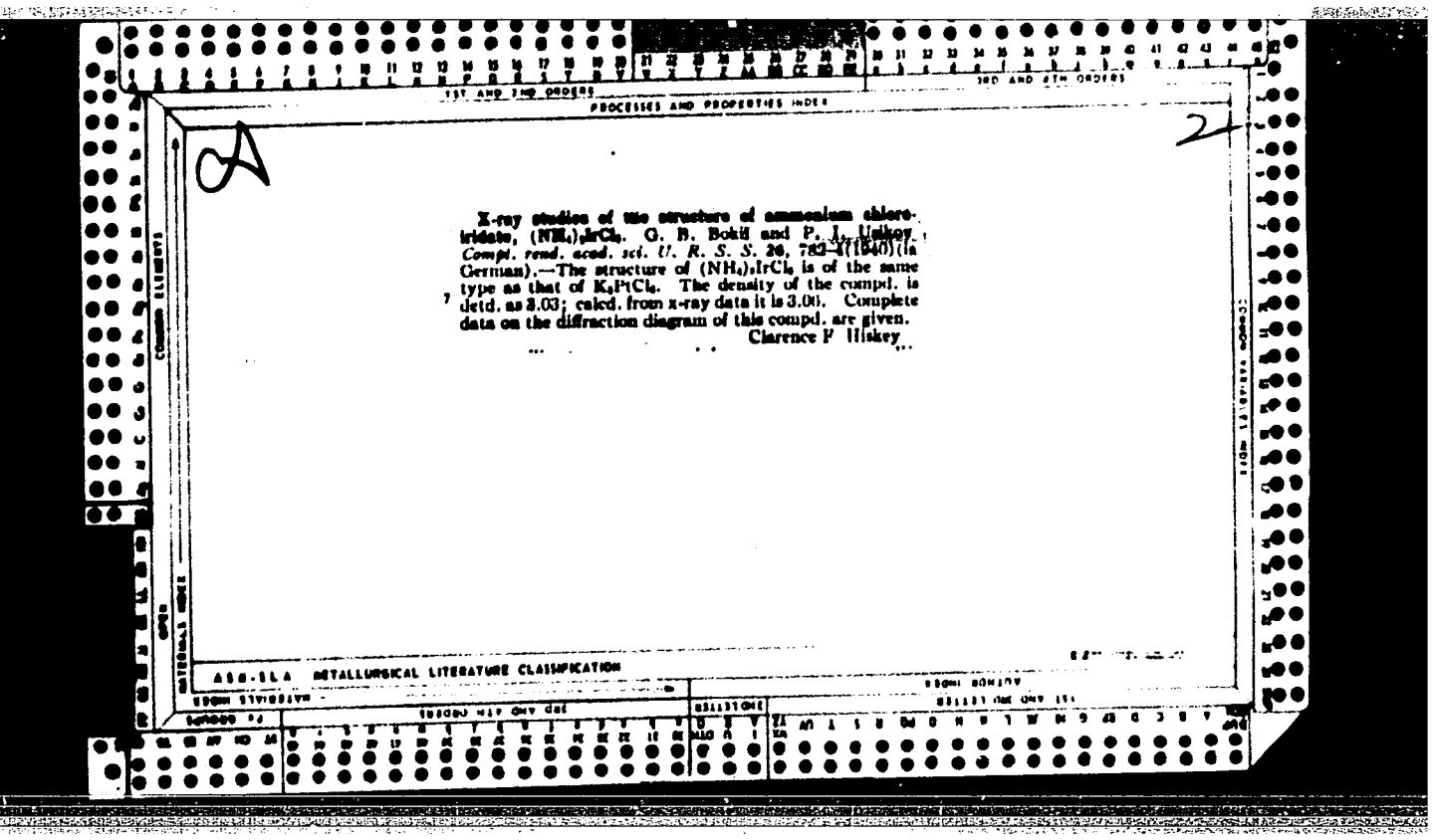

PROCESSES AND PROPERTIES INDEX

A

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X-ray studies of the structure of ammonium chloroiridate, $(NH_4)_2IrCl_6$. G. B. Bokii and P. I. Utkov. *Compt. rend. acad. sci. U. R. S. S.* 26, 783–4 (1940) (in German).—The structure of $(NH_4)_2IrCl_6$ is of the same type as that of K_2PtCl_6. The density of the compd. is detd. as 3.03; calcd. from x-ray data it is 3.00. Complete data on the diffraction diagram of this compd. are given.
Clarence P. Hiskey

A58-51A METALLURGICAL LITERATURE CLASSIFICATION

USIKOV, P M.

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by Z. G. Pinsker ("Basis of diffractional methods of investigation of perfect crystals"), B. M. Rovinskiy and L. M. Rybakova ("Investigation of dependence of mechanical properties on characteristics of structure of metals"-), L. M. Utevskiy and P. M. Usikov ("Application of microscopy in investigation of structure of alloys"), A. A. Predvoditelev and N. A. Tyapunina ("Role of reproduction of dislocations in process of plastic flow"), A. V. Pertsov, N. V. Pertsov and E. D. Shukin "Self-producing internal dispersion of metals under action of strongly superficially-active metallic melting") and I. L. Mirkin ("Problems of structural investigations, advanced by requirements of progress of technology").

reports presented at the 3rd Intervuz Conference on Strength and Ductility of Metals, Petrozavodsk State University, 24-29 June 1963.
(reported in Fizika Metallov i Metallovedeniye, Vol. 16, No. 4, 1963, p 640.
JPRS 24,651 19 May 1964.

UTEVSKIY, L. M. and USIKOV, P. M.

"Application of Electron Microscopy for Alloy Structure Studies."

report presented at the 3rd Conference of Higher Educational Institutes on Strength and Plasticity of Metals, Petrozavodsk State University, 24-29 June 1963

5(4)

AUTHOR: Usikov, S. Y.

SOV/76-33-9-19/37

TITLE: Measurement of Electrical Conductivity of Solutions at High Frequencies According to the Electrodeless Method

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 9, pp 2007-2011 (USSR)

ABSTRACT: The electrodeless measurement of electrical conductivity of liquids is suggestive of ordinary conductometric measurements; as compared to the latter, however, it has an advantage in that there is no electrode polarization nor catalysis, and measurements may be made at high temperatures. Moreover, no platinated or platinum electrodes are required. These electrodeless measuring methods are expedient when working on aggressive liquids, or when measuring the electrical conductivity on continuous flow systems. The electrodeless electrical conductivity determinations may be made according to the condenser- or induction method. A graph is shown (Fig 1) of a cell with an equivalent circuit for the first mentioned method. Electrical conductivity in the said circuit can be represented by equations (1) and (2), with the active component g being caused by a conversion of electric energy into thermal energy. An analysis

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of g and the experimental results show that the function $g = f(1/R)$ for the measurement of the electrical conductivity may be applied without electrodes (Ref 4). Measuring results concerning the dependence of g on $1/R$, obtained at different KCl-concentrations in water at frequencies of 4, 5, and 6 megacycles, according to the method described for the present case, are in good agreement with measurements according to the bridge method (Ref 4). A description is given of the determination of the electrical conductivity in liquids according to the active component g at different frequencies, without application of electrodes. It may be observed from the scheme of the system employed (Figs 3,4) that this features a ferroresonance stabilizer, a generator (5.2 megacycles), high-frequency amplifier, tube type 6N15P, a measuring circuit, a cathode voltmeter type VKS-7, and the cell (also a high-frequency generator type GSS-6 can be used). The active component g of the electrical conductivity is determined according to equations (5) and (6). The quantity $1/R$ can be determined according to the voltage of the voltmeter (previously calibrated according to the different

1/R values). When measuring the electrical conductivity at relatively low frequencies, the occurrence of a maximum on the curve $g = f(1/R)$ must be considered and a resistor must be connected in front of the cell. A graph is given showing a continuous flow cell, the electrodes of which are in a "ftoroplast-3" sheath (Fig 5). The method suggested may be applied to the determinations of the electrical conductivity of any solutions at different frequencies. The nature of the liquids can be investigated by making use of the phenomenon of relaxation. There are 6 figures and 5 references, 2 of which are Soviet.

ASSOCIATION: Gosudarstvennyy institut prikladnoy khimii (State Institute of Applied Chemistry)

SUBMITTED: February 24, 1958

USIKOV, Sergey Vasilyevich; EPSHTEYN, B.S., inzh., red.; FREGER, D.P., red. izd-va; BELOGUROVA, I.A., tekhn. red.

[Contactless high-frequency methods for measuring the conductivity and dielectric permeability of solutions] Vysokochastotnye metody izmereniia provodimosti i dielektricheskoi pronitsaemosti rastvorov beskontaktnym sposobom. Leningrad, 1961. 23 p. (Leningradskii Dom nauchno-tekhnicheskoi propagandy. Obmen peredovym opytom. Seriia: Pribory i elementy avtomatiki, no.8) (MIRA 14:7)
(Solution (Chemistry)—Electric properties)
(Chemical engineering—Electronic equipment)

26339
S/076/61/035/007/009/019
B127/B102

24.2110

AUTHOR: Usikov, S. V.

TITLE: Contact-free method of determining conductance and dielectric constant of liquids

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 7, 1961, 1489-1493

TEXT: The author used for his method an electrolytic cell with known conductance and equivalent capacitance. The total conductance of the cell may be expressed by $G = a + j\omega C_э$, where $a = 1/R_э$ the active h-f conductance between the two electrodes of the system. $C_э$ is the equivalent capacitance of the cell. The following holds:

$$a = \frac{(1/R)\omega^2 C_1^2}{(1/R)^2 + \omega^2 (C_1 + C_2)^2} \qquad (2) \text{ and}$$

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Contact-free method of determining ...

$$C_3 = \frac{(1/R^2)C_1 + \omega^2(C_1C_2^2 + C_2C_1^2)}{(1/R^2) + \omega^2(C_1 + C_2)^2} \qquad (3)$$

Assuming that a and C_3 are determined experimentally and with $1/R = \varkappa$, it follows

$$\varkappa = \frac{\omega^2 C_1^2}{2a} + \sqrt{\left(\frac{\omega^2 C_1^2}{2a}\right)^2 - \omega^2 (C_1 + C_2)^2}, \qquad (4) \text{ and}$$

$$C_2 = \frac{K_1}{2K_2} + \sqrt{\left(\frac{K_1}{2K_2}\right)^2 + \frac{K_3}{K_2}}, \qquad (5)$$

$$K_2 = 1 + \frac{(C_1 - C_2)^2 \omega^2}{a^2}, \quad K_1 = \frac{(C_1 - C_2)\omega^2}{a^2} C_1 (2C_2 - C_1) - 2C_1,$$

$$K_3 = C_1^2 \left(1 - \frac{(C_1 - C_2)\omega^2}{a^2} C_2\right).$$

The cell is connected with a high-frequency generator, a variable condenser and a valve voltmeter. a is then defined: $a = a_0 \frac{U_0 - U_1}{U_1}$. a_0 is the conductance of the circuit without the cell in the case of resonance. U_0

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Contact-free method of determining ...

is the condenser voltage for resonance without cell. U_1 is the voltage for resonance with connected cell. $C=C_{01}-C_{02}$, where C_{01} is the capacitance at the moment of resonance without cell, and C_{02} the capacitance at the moment of resonance with connected cell. The equivalent resistance R_{31} and the capacitance C_{31} are determined by $R_{31} = \frac{R}{1+\omega^2 R^2 C_2^2}$ (9), and

$C_{31} = \frac{1}{\frac{1}{C_1} + \frac{\omega^2 R^2 C^2}{1+\omega^2 R^2 C_2^2}}$ (10). Therefrom follow

$$\varkappa_1 = \frac{1}{2R_{01}} + \sqrt{\left(\frac{1}{2R_{01}}\right)^2 - \omega^2 C_2^2}, \quad (11)$$

$$C_2 = \frac{K_4}{K_5^2 R_{01}^2 \omega^2 + 1}. \quad (12)$$

$$K_4 = \frac{C_{01} C_1}{C_1 - C_{01}},$$

$$K_5 = \frac{C_{01}^2 \cdot C_1^2}{(C_1 - C_{01})^2}.$$

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Contact-free method of determining ...

For resonance in the circuit $R_{э1} = R_o \frac{I_o - I_1}{I_1}$, where I_o is the current for voltage resonance without cell, I_1 the current for voltage resonance, with cell. R_o is the active resistance for resonance without cell. The author also found that:

$R_o = R_э \frac{I_2}{I_o - I_2}$. I_2 is the current for resonance with known resistance $R_э$ in series without cell. $C_э = \frac{C_4 C_{э1}}{C_{э1} + C_4}$; $C_э$ is the capacitance necessary to obtain voltage resonance. C_4 is the capacitance of the condenser connected in series with the cell. Hence $C_{э1} = \frac{C_э C_4}{C_4 - C_э}$. Furthermore, the cell constant is given as $K = \frac{\varkappa_o}{\varkappa}$; $\varkappa_o$ is the known conductivity of the solution. The error limit of this method lies at 2.5%, which could be further reduced by applying a high quality voltmeter. The method may be applied to any liquid, including electric current conductors. There are 3 figures, 2 tables,

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S/076/61/035/007/009/019
B127/B102

Contact-free method of determining ...

and 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Gosudarstvennyy institut prikladnoy khimii Leningrad (State Institute of Applied Chemistry, Leningrad)

SUBMITTED: October 16, 1959

Card 5/5

USIKOV, S.V.

Particular features of the determination of dielectric constants and specific conductivity of substances using the noncontact method. Zhur.fiz. khim. 37 no.7:1641-1644 Jl '63. (MIRA 17:2)

1. Institut prikladnoy khimii, Leningrad.

[illegible] (MIRA 18:12)

[illegible] Submitted June 9, 1964.

USIKOV, V.A.

My methods of correcting faults in electric locomotives en route.
Elek.i tepl.tiaga no.10:26-30 O '57. (MIRA 10:11)

1. Starshiy mashinist depo Moskovka Omskoy dorogi.
(Electric locomotives)

USIKOV, V.A.

From our Handbook for the Engineer. Elek.i tepl.tiaga 4 no.4: 40-41 '60. (MIRA 13:6)

1. Mashinist-instruktor depo Moskovka, Omskaya doroga.
(Electric locomotives--Maintenance and repair)

USIKOV, V.A., mashinist-instruktor

Our memorandum to the engineer. Elek.i tepl.tiaga. 4 no.6: 35-36 Je '60. (MIRA 13:8)

1. Depo Moskovka Omskoy dorogi.
(Electric locomotives) (Electric switchgear)

USIKOV, V.A., mashinist-instruktor

Excerpts from our pamphlet for the VL23 locomotive engineer.
Elek.i tepl.tiaga 14 no.3:39-40 Mr '60. (MIRA 13:7)
(Electric locomotives--Maintenance and repair)

MAKAROVA, Yu.S.; [illegible], I.V.

New data on the interstadial sediments of [illegible]
Dokl. AN SSSR 161 no.6:1364-1367 Ap '65.

1. Geograficheskiy nauchno-issledovatel'skiy institut [illegible] gosudarstvennogo universiteta im. A.A. [illegible].

MEZHENINA, Ye.P., prof. (Kiyev 1, Kreshchatik, d.16, kv.1); USIKOVA, T.Ya., kand. med. nauk; RATNIKOVA, V.F.; BALABANETS, G.F.

Abstracts. Ortop., travm. i protez. 26 no.3:69 Mr '65.
(MIRA 18:7)

1. Iz Donetskogo instituta travmatologii i ortopedii (dir. - prof. T.A.Revenko).